

# DAIRY WEBINAR:

## How to Prepare for Conversations with RNG Developers



### Questions & Answers

- 1. Of the 2000 US digesters, how many are at food processing plants? And dairy at dairy processors?**

Patrick Serfass (ABC): *The U.S. has over 2,200 sites producing biogas in all 50 states: 250 anaerobic digesters on farms, 1,269 water resource recovery facilities using an anaerobic digester, 68 stand-alone systems that digest food waste, and 652 landfill gas projects. Within the 2,200 operational facilities, 209 digesters process food waste: 68 stand-alone, 59 on farms, and 82 at water resource recovery facilities. For comparison, Europe has over 10,000 operating digesters and some communities are essentially fossil fuel free because of them.*

- 2. Has the Biden administration reinstated the 30% fed tax credit for digester/RNG projects?**

Patrick Serfass (ABC): *The 30% Investment Tax Credit (ITC) for biogas-electricity projects is active for projects that start construction before December 31, 2021. The American Biogas Council is working with Congress to get it extended for 5 years, plus the creation of a new ITC for biogas to RNG and Biogas to heat projects.*

- 3. What happens to high value RINs when food waste is added as a co-substrate?**

Brad Pleima (EcoEngineers): *The RIN D-code is determined by the feedstock used to generate the renewable energy, a D3 RIN is generated from a cellulosic feedstock (manure, wastewater, landfills) and a D5 RIN is generated from a non-cellulosic feedstock (essentially, all other feedstocks). Currently, the value of a D3 RIN is about 2x the value of a D5 RIN. If there is a mixture of feedstocks, all RINs produced are D5 unless: a) there is extensive testing to provide a rationale for separating the values (in most cases this is too expensive to make it practical); or b) the biogas system has multiple tanks in which case EPA will consider each tank or group of tanks like a separate system to allow D3 and D5 RINs to be produced at the same site and not devalue all D3 RINs.*

Patrick Serfass (ABC): *The American Biogas Council is also actively working with EPA to approve a methodology to split your D3 and D5 RINs without testing or segregating material into different digester tanks—just a little multiplication and subtraction. This will allow digesters to add as much food waste as they want without devaluing their D3 RIN generation. However, food waste might have a different impact on the carbon intensity score with the Low Carbon Fuel Standard.*

- 4. Does carbon avoidance create the highest Carbon Intensity (CI) score?**

Brad Pleima (EcoEngineers): *The Carbon Intensity (CI) score of a fuel determined by the lifecycle carbon emissions as calculated using the CA GREET model. This lifecycle analysis considers all*

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*aspects of feedstock, fuel production, co-product usage, and transportation and consumption of the finished fuel. For dairy RNG projects, stopping the direct emission of methane at open lagoons creates avoided emissions credits under CA GREET which can often make the overall CI score well below zero (i.e., carbon negative). (Note – this is not necessarily true for all project types, so I'd recommend keeping the answer more generic).*

**5. Why the broad range (-100 to -300) CI for manure?**

Brad Pleima (EcoEngineers): *As mentioned in the answer above, the manure management system used before the project influences the CI score. If the manure is hauled regularly and not allowed to spend significant time in anaerobic storage the emissions are lower, and the CI score will not be as negative as it would be if the manure is flushed to a lagoon and stored for a long time under anaerobic conditions. Other factors which greatly influence dairy RNG CI scores are: The presence of solids separation between the manure collection and the lagoons, the volume of manure collected and sent to the lagoon systems, the RNG yield from the digester, and other secondary factors.*

**6. How many digesters will be online by the end of 2022? How many will need to come online to meet demand?**

Brad Pleima (EcoEngineers): *There is significant change occurring in the RNG sector of the California LCFS program from the arrival of ultralow carbon RNG from dairy/swine manure and food waste biogas projects. In 2019, about 94% of RNG consumed in California was RNG derived from landfill gas, with an average CI of 45 gCO<sub>2</sub>e/MJ. However, RNG from animal manure with ultralow CI's (-100 to -300 gCO<sub>2</sub>e/MJ) is on track to be 45% California consumption by 2023 as projected by EcoEngineers. Based on these numbers it seems that the demand for RNG will continue to exceed the supply for a considerable time in the future.*

Patrick Serfass (ABC): *Just on farms, the biogas industry brings about a dozen new digesters online each year. In 2019, about \$600 million dollars of investment was announced for new biogas systems, and a staggering \$1.6 billion for 2020. Since it takes 1-3 years to develop most biogas systems, I would say that we should soon expect to see a sharp increase in new biogas systems coming online in all sectors.*

**7. Do you have to connect to an interstate pipeline to be able to sell into the California market, or can you connect directly to a local industrial park that would use the RNG?**

Brad Pleima (EcoEngineers): *RNG has seen unprecedented growth in the U.S. because of the CA-LCFS, which credits dairy digester gas with "methane offset credits" for closing methane leakage*

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*at manure lagoons. A key feature of the CA-LCFS that led to the successful launch of the RNG sector is the “book-and-claim” system for environmental attributes. Book-and-claim accounting refers to the chain-of-custody model in which decoupled environmental attributes are used to represent the ownership and transfer of transportation fuel without regard to physical traceability. Both the RFS and CA LCFS programs require interconnection to a commercial pipeline that is connected to the overall natural gas grid. So, for practical purposes, the pipeline needs to be connected back to an interstate pipeline system but can be injected into a local distribution company (LDC).*

*Patrick Serfass (ABC): In addition to what Brad says, if you are not close to a gas pipeline, it’s worth learning more about the potential to use electricity to participate in the federal Renewable Fuel Standard (the RFS generates RINs) and the CA Low Carbon Fuel Standard (LCFS projects generate carbon credits). Currently a few biogas projects generate electricity to charge electric vehicles and the carbon credits in the LCFS. We are waiting for EPA to process the first of several dozen projects waiting to generate “eRINs” from the RFS. When that happens, we hope sometime this year, using electricity will be more attractive than it is today because of the low prices electric utilities offer. But there is no assurance for when EPA will act, so there is a risk of opportunity loss related to waiting.*

**8. Will carbon credits only apply to participating states, my state of Washington was not listed?**

*Brad Pleima (EcoEngineers): Carbon credits are traded across the country on several exchanges. Some of the credits are required by law, compulsory credits, and others are traded on voluntary markets. The State of Washington has tried to pass a similar LCFS program for several years and it appears they are close again this year.*

*Patrick Serfass (ABC): Pay attention to HB 1091 in Washington. It will establish a LCFS-like program in Washington which will allow carbon credits to be produced and sold like in California. This is a very active bill right now and needs more support, so if you are in Washington and are willing to say you support it, please email ABC at [info@americanbiogascouncil.org](mailto:info@americanbiogascouncil.org), so George or I can help you get plugged in with minimal effort on your part.*

**9. Can I get into the California pay structure?**

*Brad Pleima (EcoEngineers): Depending on the project and the ability to contract and trace a route to the California gas system most projects can access the Low Carbon Fuel Standard (LCFS)*

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*market. Note that the RNG must be used as vehicle fuel within California to participate in the LCFS program.*

**10. What type of partnerships were offered to you from the RNG developers?**

*John Larson (Florida Dairy Farmer): What first caused us to consider an RNG project was that the developers were offering a turnkey system in return for a manure supply agreement. There were many different pricing structures offered to us, but we looked at them from a per cow basis. We were looking for someone who would work within our existing permit and agreement structure as well as working with the engineers who were already familiar with the farm.*

**11. Is it becoming easier and easier to partner as the understanding on both sides increases?**

*John Larson (Florida Dairy Farmer): Some of them are and some of them are not, you really must dig in on what is practical for your farm.*

**12. How much does it cost to interconnect your project in Florida?**

*John Larson (Florida Dairy Farmer): There are two interconnection points, one between one set of farms and the other between two other facilities. We were not part of developing that portion of the project, so I do not have exact costs per interconnection.*

**13. What were your environmental concerns re the 2-mile manure pipeline?**

*John Larson (Florida Dairy Farmer): We did not have too much concern with the pipeline as it was carrying gas to the interconnection and not manure.*

**14. Can you talk about how you got buy in from residents/the community?**

*John Larson (Florida Dairy Farmer): We were fortunate that the community and the governor were very supportive, and they agreed that this type of project was right where they wanted to go. Because our farms are close to the everglades, which are an environmentally sensitive area, this project was more attractive to the community and was supported from the start.*

**15. Which BMPs have you instituted at the time of and since the digester RNG project?**

*John Larson (Florida Dairy Farmer): We continue to follow the same practices that we were using before the addition of the digester.*

**16. John, how did you address being a flush dairy with low % TS? Most dairies in the SE have high water content. Can you speak about the type of digester you are installing at your dairy?**

*John Larson (Florida Dairy Farmer): The developer is installing covered lagoon digesters.*

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**17. John, were you able to use the byproducts from the digester for bedding?**

John Larson (Florida Dairy Farmer): *We use sand bedding and are not currently utilizing the solids removed from before the digester.*

**18. John, do you get a royalty for use of your manure or do you have an equity stake in the project?**

John Larson (Florida Dairy Farmer): *We do not have an equity position in the project. We have negotiated a price per cow and additional agreements related the solids and gas sales.*

**19. Soil health and regenerative ag are “hot” buzzwords which leads to carbon farming programs entering the horizon. Are manure digesters to RNG able to take advantage of carbon credits in any way, if the residual CO<sub>2</sub> is beneficially reused but not for soil health?**

Mark Stoermann (Newtrient): *Due to the reduction of GHG emissions in the form of methane anaerobic digesters generate carbon credits whether the biogas is flared, cleaned for RNG, or used to generate electricity. Additional carbon credits may be available in the future as markets consider the soil health benefits and soil carbon improvement by use of digestate for a fertilizer and soil amendment.*

**20. It was noted that manure digesters reduce odors/pathogens to enhanced land application. But isn't digestate land application a big issue in Florida due to nutrient overloads to L Okeechobee and others contributing to harmful algal blooms?**

Mark Stoermann (Newtrient): *Most dairies are required to apply manure or digestate at agronomic rates, which means only applying what the crop needs in each growing season. In the past overapplication may have been an issue, but this has been significantly reduced by applying the 4R's of nutrient stewardship, or nutrient management. The 4R's stand for right source, right rate, right time, and right place. Digestate offers several advantages for land application that manure itself does not. Because complex carbon compounds are broken down in the digester the nutrients are more plant available and therefore less likely to leach through the soil or run off after being applied.*

**21. What dairy head count have you found to be the minimum for viable ROI for this program? How many cows do you need to make an RNG project cost effective? What size dairy facility is ideal for a digester? What size digester is currently practical to build?**

Mark Stoermann (Newtrient): *Digesters can be built and operate efficiently on relatively small dairy operations (<100 cows) what determines the ROI is the market for renewable energy where*

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*the dairy is located and the cost to interconnect to the gas or electrical grid. Generally, it takes at least 5,000 total cows from one or more dairies feeding into one gas interconnection point to justify the cost of a gas line interconnect if the digesters in the system are heated and designed to maximize biogas production. When utilizing ambient temperature covered lagoon systems about twice as many cows are needed, because the biogas production is not as optimal.*

**22. Can anyone comment on digester projects dairy v swine? Covered lagoons are cheapest yet swine yields less biogas. Within CA dairy, makes more economic sense to the farmer and outside of CA swine?**

Mark Stoermann (Newtrient): *Both dairy and swine manure are digestible, but because of the higher fiber in a dairy ration dairy manure produces slightly less biogas per pound than swine manure. The biggest advantage a covered lagoon system has with swine manure is that the solids do not have to be removed regularly, eventually they almost all will digest, dairy manure lagoons tend to accumulate fiber that can reduce the volume of the digester and decrease gas production. This means that some form of coarse solids separation must be done before a covered lagoon dairy digester and even this does not ensure that the solids will not accumulate.*

Patrick Serfass (ABC): *When comparing dairy and swine, as Brad said in the response to an earlier question, determining which might be more lucrative often has more to do with the manure management practices of an individual farm than what type of livestock it has. The more the farm is emitting in CO<sub>2</sub>-equivalent emissions today, the more of an opportunity exists to reduce those emissions and create more carbon credits that can be sold.*

**23. It has been speculated that the separation of the nutrients from the water would be greatly assisted by a digester. Has there been progress on the fractioning the various nutrients out of the water into a sellable form or to be used by a farm in precision ag manner?**

Mark Stoermann (Newtrient): *One of the hard to quantify benefits of anaerobic digestion is that it makes further nutrient recovery much easier to accomplish. Once the manure has been through a digester it is more homogeneous, less viscous, has lower solids, lower pathogens and often requires less treatment to capture and fraction nutrients. There are many different technologies to accomplish this, many are listed in the Newtrient Technology Catalog. Unfortunately, at this time there are not many markets that will support the use of these technologies.*

**24. Cost of the manure management slide (see deck) ---is the land applied at the farm? What is the added cost if it needs to be transported about 20 miles or so?**

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Mark Stoermann (Newtrient): *The basis for the slide assumes that the direct spread would be accomplished in one hour per load. That means the land application would have to take place relatively close to where the manure is stored. Typically, when manure is moved more than a few miles the hauling cost can justify further treatment and dewatering to concentrate the nutrients and reduce the hauling costs.*

**25. Is there any nutrient recovery involved, or are we simply just recovering RNG?**

Mark Stoermann (Newtrient): *Anaerobic digestion only effects the carbon content of the manure, typically you have the same nutrients in the digestate as you had in the raw manure, although some are in slightly different forms, ammonium rather than organic nitrogen for example. At this time, most projects are not putting in digestate treatment unless it is required.*

**26. If upgrades are necessary to the manure system at the farm to accommodate the AD system, does the developer pay for the upgrades?**

Mark Stoermann (Newtrient): *In most cases these sorts of questions are part of negotiating the manure supply agreement. Many developers will cover the costs directly related to changes that they require to the manure management system, but every project is different.*

**27. How many MMBTU's does a single cow produce per day?**

Mark Stoermann (Newtrient): *A cow produces approximately 20 MMBTU's per year when the manure is digested in a mesophilic digester.*

**28. Is there additional benefit for being a non-GMO farm?**

Mark Stoermann (Newtrient): *At this time, all RNG is injected into the natural gas grid and comingled with fossil natural gas, I have not heard of any premium received by non-GMO or organic farms.*

**29. What is the typical cost-sharing split between the farmer and the developer for RNG projects?**

Mark Stoermann (Newtrient): *This is part of negotiating the manure supply agreement and the development contract, which are two different things. Many developers will cover all the costs directly related to the digester and RNG and require little or no investment by the farm. In some cases, the farm may want to be part of the ownership of the project and will want an equity position in the project, this too can be negotiated with some developers and others are not open to this model, as said before every project is different.*

**30. Are you doing anything with gasification?**

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*Mark Stoermann (Newtrient): Newtrient is currently looking at testing a manure gasification system as part of a Conservation Innovation Grant (CIG) it received from the Natural Resources Conservation Service (NRCS). Upon completing the study, we will have a webinar on gasification in general and the specific system that was studied.*